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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/722,937	11/26/2003	Trausti T. Kristjansson	M61.12-0577	9636

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WESTMAN CHAMPLIN (MICROSOFT CORPORATION)
SUITE 1400
900 SECOND AVENUE SOUTH
MINNEAPOLIS, MN 55402-3319

EXAMINER

VO, HUYEN X

ART UNIT	PAPER NUMBER
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2626

MAIL DATE	DELIVERY MODE
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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/722,937

Applicant(s)

KRISTJANSSON ET AL.

Examiner

Huyen X. Vo

Art Unit

2626

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 26 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 2 sheets.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

2. Claims 12-20 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

3. Claim 12-20 are drawn to a "program" *per se* as recited in the preamble (*computer-readable medium is defined as a communication media that includes a wireless media or carrier wave*) and as such is non-statutory subject matter. See MPEP § 2106.IV.B.1.a. Data structures not claimed as embodied in computer readable media are descriptive material *per se* and are not statutory because they are not capable of causing functional change in the computer. See, e.g., *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure *per se* held nonstatutory). Such claimed data structures do not define any structural and functional interrelationships between the data structure and other claimed aspects of the invention, which permit the data structure's functionality to be realized. In contrast, a claimed computer readable medium encoded with a data structure defines structural and functional interrelationships between the data structure and the computer software and hardware components which permit the data structure's functionality to be realized, and is thus statutory. Similarly, computer programs claimed as computer listings *per se*, i.e., the descriptions or expressions of the programs are not physical "things." They are neither

computer components nor statutory processes, as they are not "acts" being performed.

Such claimed computer programs do not define any structural and functional interrelationships between the computer program and other claimed elements of a computer, which permit the computer program's functionality to be realized.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless – (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-7 and 9-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Ephraim (IEEE Publication, from IDS).

6. Regarding claim 1, Ephraim discloses a method of identifying a clean speech signal from a noisy speech signal, the method comprising:

identifying a set of frequency values that represent the noisy speech signal (*right column, page 729*);

determining parameters of at least one posterior probability distribution of at least one component of a clean signal value based on the set of frequency values without applying a frequency-based transform to the set of frequency values (*referring to the MAP Signal Estimation, right column on page 730 to left column on page 731*); and

using the parameters of the posterior probability distribution to estimate a set of frequency values for a clean speech signal (*referring to the MAP Signal Estimation, right column on page 730 to left column on page 731, producing a clean speech signal*).

7. Regarding claim 12, Ephraim discloses a computer-readable medium having computer-executable instructions for performing steps comprising:

determining a posterior probability based on logarithms of frequency values that represent a frame of a noisy speech signal, wherein a frequency-based transform is not applied to the logarithms of frequency values before the logarithms of frequency values are used to determine the posterior probability (*referring to right column on page 729 to left column on page 731*); and

using the posterior probability to estimate a frame of a clean speech signal (*referring to the MAP Signal Estimation, right column on page 730 to left column on page 731, producing a clean speech signal*).

8. Regarding claims 2 and 13, Ephraim further discloses the method of claims 1 and 12, respectively, wherein the set of frequency values for the clean speech signal comprises a set of log-magnitude values (*right column on page 729, lines 1-10*).

9. Regarding claims 3 and 14, Ephraim further discloses the method of claims 2 and 13, respectively further comprising taking the exponent of each of the log-magnitude values in the set of log-magnitude values to produce a set of magnitude

values for the clean speech signal (*left column, second paragraph on page 730 and equation 33 on page 732*).

10. Regarding claims 4 and 15, Ephraim further discloses the method of claims 3 and 14, respectively, further comprising transforming the set of magnitude values for the clean speech signal into a set of time domain values representing a frame of the clean speech signal (*transforming the clean signal into a time domain for playback is inherent in the system*).

11. Regarding claim 5, Ephraim further discloses the method of claim 4 further comprising transforming a frame of the noisy speech signal into the frequency domain to form the frequency values for the noisy speech signal (*right column on page 729*).

12. Regarding claim 6, Ephraim further discloses the method of claim 5 wherein transforming a frame of the noisy speech signal into the frequency domain further comprises generating a set of frequency phase values and wherein transforming the set of magnitude values for the clean speech signal into a set of time domain values further comprises using the set of frequency phase values to transform the set of magnitude values (*left column, second paragraph on page 730 and equation 33 on page 732*).

13. Regarding claim 7, Ephraim further discloses the method of claim 1 further comprising applying a time-based filter to each of the frequency values that represent

the noisy speech signal, the time-based filter utilizing at least two frames of frequency values during a single filter operation (*left column on page 731*).

14. Regarding claim 9, Ephraim further discloses the method of claim 5 wherein transforming a frame of the noisy speech signal into the frequency domain comprises producing a set of more than one hundred frequency magnitude values (*right column on page 729, depending the frame size*).

15. Regarding claims 10-11 and 18-19, Ephraim further discloses the method of claims 1 and 12, respectively, wherein determining the parameters of at least one posterior probability distribution comprises utilizing an iterative process to determine the parameters (*MAP is a recursive algorithm*), and wherein determining parameters of at least one posterior distribution comprises determining parameters for each of a set of mixture components (*MMSE Estimation section on page 728, Gaussian and psd are composed of mixture components*).

16. Regarding claim 20, Ephraim further discloses the computer-readable medium of claim 12 wherein determining a posterior probability comprises filtering the logarithms of the frequency values over time and using the filtered logarithms to determine the posterior probability (*MMSE Estimation section on page 728*).

17. Regarding claims 16-17, Ephraim further disclose the computer-readable medium of claim 15 wherein transforming the magnitude values comprises performing an inverse Fast Fourier Transform (*transforming the clean signal into a time domain for playback is inherent in the system*), wherein performing an inverse Fast Fourier Transform further comprises using phase values generated by converting the frame of the noisy speech signal from the time domain to the frequency domain (*transforming the clean signal into a time domain for playback is inherent in the system*).

Claim Rejections - 35 USC § 103

18. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

19. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ephraim (IEEE Publication, from IDS).

20. Regarding claim 8, Ephraim fails to specifically disclose the method of claim 7 wherein the time-based filter comprises a Finite Impulse Response filter. However, an FIR filter is well known to one of ordinary skill in the art. The advantage of using the FIR filter is that it can be written in software that provides convenience for maintainance.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Huyen X. Vo whose telephone number is 571-272-7631. The examiner can normally be reached on M-F, 9-5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Edouard can be reached on 571-272-7603. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

HXV

4/20/2007